RETScreen™ International:
A Standarized Tool for Assessing Potential Renewable Energy Projects

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Abstract

Renewable energy technology (RET) projects are not routinely considered by planners and decision-makers at the critically important initial planning stage. This article describes an innovative tool, the RETScreen Renewable Energy Project Analysis Software, which has been developed to help address this barrier. RETScreen can be used world-wide to easily evaluate the energy production, life-cycle costs and greenhouse gas emission reductions for various RETs.

Introduction

Most countries have ample renewable energy resources available to them, such as sun, wind, water, biomass and/or geothermal. Renewable energy technologies are sufficiently developed and reliable to meet an increased proportion of the world's energy needs. In fact, renewable energy projects are presently cost-effective in a number of applications.

"Global climate change mitigation particularly depends on widespread use of these technologies in all countries. These technologies can also advance important national development goals, such as cleaner air, energy services for rural populations, and more efficient domestic industries. Many opportunities exist to utilise these technologies although realisation of these opportunities is often constrained by many barriers." These include a "lack of information about technologies, opportunities, costs and benefits; lack of human resource and institutional capacities to evaluate, finance and conduct investment projects; high transaction costs; and other institutional constraints." [1]

As a result of these barriers, RET projects are not routinely considered by utility planners, government policy makers, bankers, engineers, architects and other decision-makers at the critically important initial planning stage, even where they have proven to be cost-effective and reliable in similar situations. If RET projects are not put "on-the-table" up-front, it is usually impossible to get them considered later on the in the energy project or program development process. The RETScreen Renewable Energy Project Analysis Software was developed to address this important barrier.

RETScreen International

RETScreen International is an innovative and unique renewable energy awareness, decision-support and capacity building tool developed by CEDRL with the contribution of over 85 experts from industry, government and academia (see http://retscreen.gc.ca). The core of the tool consists of a standardised and integrated renewable energy project analysis software that can be used world-wide to evaluate the energy production, life-cycle costs and greenhouse gas emission

reductions for various types of RETs. In addition to the software, the tool includes: product, cost and weather databases; an online manual; a Website; project case studies; and a training course.

New UNEP GHG Model

The United Nations Environment Programme's (UNEP) Division of Technology, Industry and Economics (DTIE) and Natural Resources Canada's CEDRL are co-operating to increase the awareness and enhance the usefulness of RETScreen internationally. The partners have concluded that that one way to bring about an increase in RET investments is to help project promoters and their financial backers better analyse the technical and financial viability of possible projects. As part of this collaboration, UNEP/DTIE and CEDRL have developed a new greenhouse gas emissions (GHG) mitigation model for RETScreen with funding from the Global Environment Facility (GEF). The UNEP Collaborating Centre on Energy and Environment also participated in this work. The new GHG model allows users to calculate the estimated GHG emissions avoided and the Clean Development Mechanism (CDM) and Joint Implementation (JI) financial impact for the proposed RET project. The use of this model simplifies the calculation of GHG emissions and results in substantial cost savings for users and increased opportunities for CDM and JI projects for government and industry.

New NASA Global Satellite Data

The National Aeronautics & Space Administration (NASA) and CEDRL are also co-operating to facilitate the use of NASA's global satellite solar data with RETScreen and to develop a new global weather database (see http://eosweb.larc.nasa.gov/sse) for the tool. This work is sponsored as part of NASA's Earth Science Enterprise Program and is being carried out at the NASA Langley Research Center and at CEDRL. This collaboration provides RETScreen users access (free-of-charge) to such satellite data as the amount of solar energy striking the surface of the earth, global temperatures and wind speeds simply by clicking on links in either the RETScreen software or the NASA Website. These data had previously only been available from a limited number of ground monitoring stations and are critical for assessing the amount of energy a RET project is expected to produce. The use of these data results in substantial cost savings for users and increased market opportunities for industry while allowing governments and industry to evaluate regional renewable energy resource potential.

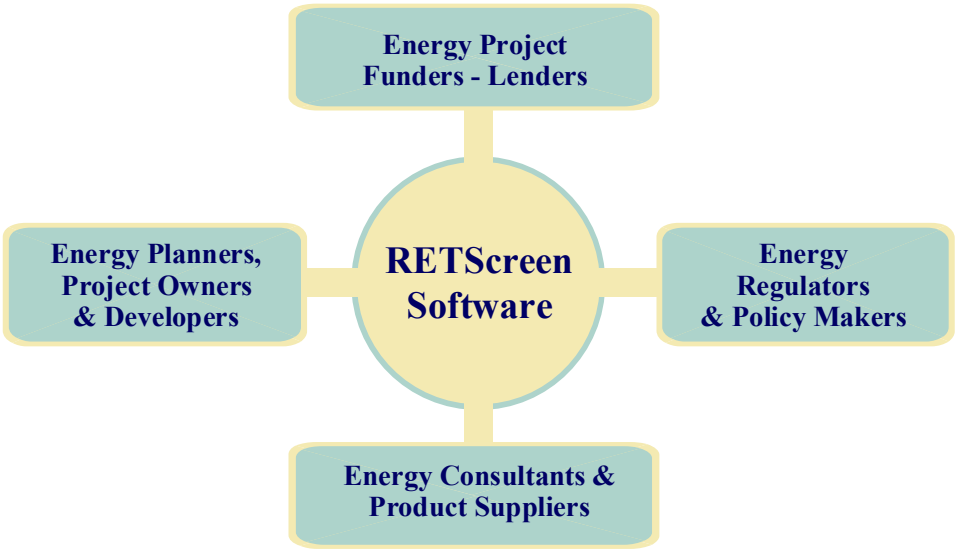
Use of the Tool

Numerous people world-wide have been using the tool for a variety of purposes, including: preliminary feasibility studies; project lender due-diligence; market studies; policy analysis; information dissemination; training; sales of products and/or services; project development & management; and product development/R&D.

For example, RETScreen was instrumental in helping CEDRL and a team of eleven consulting firms prepare preliminary feasibility studies for 56 potential RET projects at a cost of less than $2,000 each. Similar studies would otherwise have cost in the order of 5 to 10 times this amount! As a result, money saved is now being used to develop a number of these projects.

The software also facilitates project implementation by providing a common evaluation platform for the various stakeholders involved in the project, as depicted in Figure 1.

Figure 1
Common Project Evaluation Platform

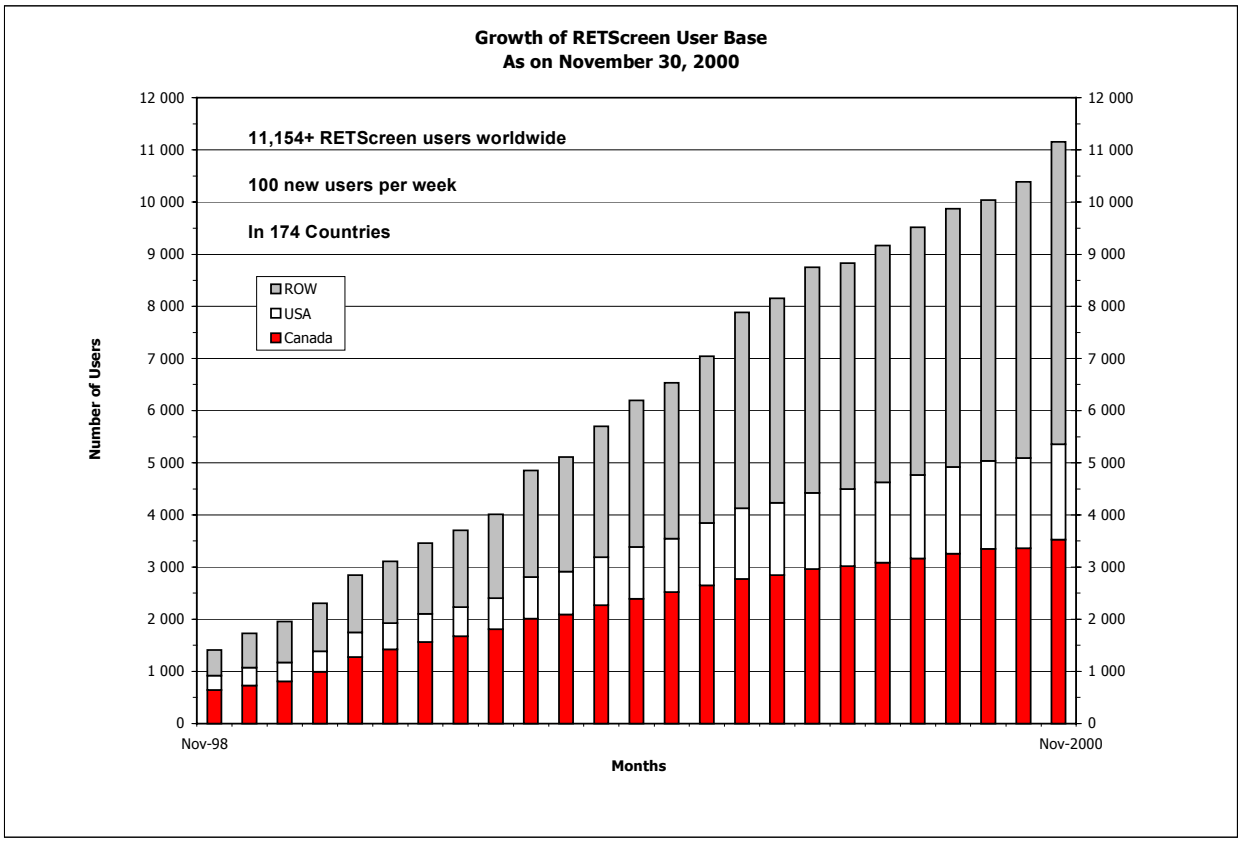


To illustrate how this could work, the RETScreen software files, which are in Microsoft® Excel format, can be shared among the various project stakeholders. A consultant may be asked to prepare a RETScreen study for the project owner, such as an independent power producer (IPP). The IPP may then want to change input values as part of a sensitivity analysis of key parameters such as return on investment. The IPP may in turn be asked by the potential lender to submit the file to them so that they can perform the project due-diligence review. In parallel, the utility regulator may want the project file to verify the GHG estimates, an so on. The time and costs to complete this process are reduced dramatically using RETScreen.

Substantial International Uptake

RETScreen has had a rapid uptake around the world. Since its release in May 1998, more than 11,000 users in more than 170 countries have licensed a copy of the software (free-of-charge) from CEDRL. The cumulative growth of the RETScreen user base is shown in Figure 2. Demand is growing at about 100 new users per week and significant growth is now taking place outside of Canada.

Figure 2



The rapidly expanding use of RETScreen around the world, the recent development of the GHG model with UNEP and the new global satellite data from NASA are all contributing to making RETScreen an international standard for RET project evaluations. The use of the software by planners and decision-makers builds their capacity to easily consider RET projects at the critically important initial planning stage. This will help accelerate the deployment of environment-friendly RETs while saving a substantial amount of money and time.

[1] Martinot, Eric and McDoom, Omar, "Promoting Energy Efficiency and Renewable Energy: GEF Climate Change Projects and Impacts," October 1999 Pre-Publication Draft, Global Environment Facility.